

REMARKS

Support for the above claim amendments can be found in the specification in at least the following locations: pg. 5, lines 4-14; pg. 10, line 5 to pg. 11, line 2; and original Claims 8-11.

First, the Applicants would like to note with appreciation the courtesies extended by the Examiner in granting a personal interview on June 30, 2004. During that interview, the Applicant's representative and Examiner Lu discussed the differences between the subject matter defined by the pending claims and the references cited in the Official Action, particularly the Heller reference.

Claims 1-13 have been rejected under 35 U.S.C. §112, first paragraph, therefore this rejection, which appears on pages 2-3, numbered paragraphs 2 and 3 of the Official Action, is respectfully traversed. According to the Official Action, the phrase "amplified superquenching" is allegedly not supported by the disclosure. In order to more clearly define the claimed subject matter, Claim 1 has been amended to remove the reference to "amplified superquenching". Accordingly, the amendment to Claim 1 obviates this rejection. Reconsideration and withdrawal of this rejection is therefore respectfully requested. It should be noted, however, that support for the "amplified superquenching" limitation does in fact appear in the specification at least at page 5, line 6 to page 7, line 2.

Claims 1-13 have also been rejected under the judicially created doctrine of obviousness-type double patenting. This rejection, which appears on pages 13-14, numbered paragraphs 11 and 12 of the Official Action, is respectfully traversed.

Attached hereto is a Terminal Disclaimer over U.S. Patent Application Serial No. 10/098,387. It is respectfully submitted that the filing of this terminal disclaimer obviates this rejection. Reconsideration and withdrawal of this rejection is therefore respectfully requested.

Claims 1, 4-8, 12 and 13 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,849,489 (hereinafter referred to as “Heller”). This rejection appears on pages 4-7, numbered paragraph 5 of the Official Action. Claim 11 has been rejected under 35 U.S.C. §102(b) as being anticipated by Heller as evidenced by U.S. Patent No. 4,959,305 to Woodrum (hereinafter referred to as “Woodrum”). This rejection appears on page 8, numbered paragraph 6 of the Official Action. Claims 2 and 3 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Heller in view of U.S. Patent No. 6,355,421 B1 to Coull et al. (hereinafter referred to as “Coull”). This rejection appears on pages 8-10, numbered paragraphs 7 and 8 of the Official Action. Claim 9 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Heller. This rejection appears on pages 10-11, numbered paragraph 9 of the Official Action. Claim 10 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Heller in view of Chen et al., PNAS, 96, 12287-12292, October 1999 (hereinafter referred to as “Chen”). This rejection appears on pages 12-13, numbered paragraph 10 of the Official Action. Each of the aforementioned rejections is respectfully traversed.

All of the prior art rejections rely upon Heller. According to the Official Action, Heller discloses a complex formed by a single DNA polynucleotide strand with multiple donor groups (D) and a single acceptor group (A) (FIG. 2A of Heller, pg. 4 of the Official Action). This complex, however, is not a “fluorescent moiety” as defined in amended Claim 1. In particular, according to Claim 1, the “fluorescent moiety” comprises a plurality of fluorescers *attached to or part of a conjugated polymer backbone or a J-aggregate* of a plurality of fluorescer molecules. Conjugated polymers comprise a chain or backbone of alternating double and single bonds. The polynucleotides disclosed in Heller clearly do not comprise a conjugated backbone. Further, there is no teaching or suggestion in Heller of J-aggregates. The term “J-aggregate” refers to aggregates of fluorescer molecules (*i.e.*, monomers) that exhibit an absorption band different

from the individual monomers making up the aggregate. In the case of J-aggregates, the absorption band is shifted to higher wavelengths (See, for example, Daehne et al., “Surface Morphological Studies of J-Aggregate Thin Films by Atomic Force Microscopy”, *Langmuir*, pp. 565-568 (1998)). Accordingly, it is respectfully submitted that Heller does not teach or reasonably suggest the invention as defined by Claim 1.

It is respectfully submitted that the other references cited in the Official Action do not remedy the above noted deficiencies of Heller. First, the Official Action has pointed to no teaching or suggestion in any of Woodrum or Coull which would reasonably suggest the chemical moiety as set forth in Claim 1. In fact, Coull is merely being relied upon for its teaching of peptide nucleic acids (pg. 9 of the Official Action) and Woodrum is merely being relied upon as evidence that fluorescein carries a negative charge (pg. 8 of the Official Action). Further, while Chen discloses assays employing a fluorescent conjugated polymer (*i.e.*, MPS-PPV), the proposed combination of Heller and Chen would render the complex disclosed by Heller unfit for its intended purpose. In particular, Heller relies upon the hybridization of the polynucleotide strand to which the donor chromophores are attached to achieve the appropriate spacing for efficient donor-donor and donor-acceptor energy transfer (FIG. 2A of Heller). The fluorescent polymer of Chen does not have a polynucleotide backbone and would therefore not hybridize to a target nucleic acid. Accordingly, substitution of the MPS-PPV polymer of Chen in the complex of Heller would result in a complex which is unfit for its intended purpose (*i.e.*, hybridization to a target resulting in efficient donor-donor and donor-acceptor energy transfer).

Heller also teaches away from the proposed combination. In particular, Heller relies upon the spacing of the donor-donor pairs at specified distances on the polynucleotide strand (Column 13, Lines 45-59 of Heller). In fact, Heller teaches that close spacing of the donor-donor pairs can reduce energy transfer efficiency. As set forth in the attached declaration, the chromophores in

fluorescent polymers such as MPS-PPV have much closer spacings than those disclosed in Heller.

In view of the above, it is respectfully submitted that Claim 1 is patentable over the cited references. Claims 2-13 and 22-24 depend from Claim 1 and are therefore also patentable over the cited references for at least the reasons set forth above with respect to Claim 1.

Reconsideration and withdrawal of the aforementioned rejections is therefore respectfully requested.

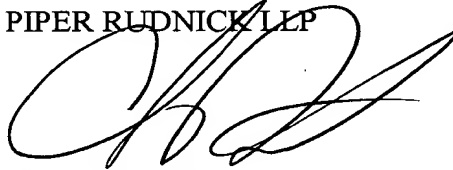
In addition, Claim 22 can be further distinguished from the cited references. In particular, Claim 22 depends from Claim 1 and recites that “. . . the property altering element is non-fluorescent.” In Heller, the fluorescence from the *acceptor* is measured (Column 4, Lines 34-39 of Heller). Thus, Heller requires the use of fluorescent acceptor moieties. The Official Action, however, refers to the “fluorescence acceptor” of Heller as a “property-altering element” (pg. 4 of the Official Action). As set forth above, Claim 22 recites that the property-altering element is non-fluorescent. Accordingly, Claim 22 can be further distinguished from the references cited in the Official Action.

CONCLUSION

In view of the above, Applicants submit that this application is now in condition for allowance and therefore request favorable consideration. If any issues remain which the Examiner feels may be best resolved through a personal or telephonic interview, however, the Examiner is respectfully requested to contact Applicants' counsel at the phone number listed below.

Respectfully submitted,

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